

The feature of another end portion firmly fixed to one of the plurality of said refrigerant pipes having different outer diameters of the multi-unit type air conditioner, said firmly fixing operation being performed at an installation site of the multi-unit type air conditioner with the another end portion being fitted to the one of the refrigerant pipes is shown in FIG. 1 and is substantially described in the paragraph bridging pages 3-4 of the specification.

New Claims 21 and 26 recites that the firm fixing is performed by brazing. This is also described in the specification at page 11, lines 24-25.

New Claim 22 and 27 recite that the branch pipe joint body is formed so as to provide a Y-shape having two branched portions and one root portion, and two communication ports are formed at the two branched portions while one common communication port is formed at the one root portion, is substantially shown in FIG. 11 and is described in the specification at page 12, lines 15-23.

Claim 23 and 29 incorporate features of the original claims 11 and 12, and recite that some of the communication ports are directly firmly fixed to some of the refrigerant pipes without using the connecting pipes, as was originally specified in Claim 11 and is substantially described in the specification at page 13, lines 8-11.

Claim 24 incorporates features of the original Claim 13 and further recites that another end portion of the connecting pipe is firmly fixed to one of the plurality of refrigerant pipes having different outer diameters of the multi-unit type air conditioner, as shown in FIG. 1.

Claims 1-18 were rejected under 35 U.S.C. § 102 as being anticipated by EPO Patent 0,036,984. However, new Claims 19-24 are believed to clearly define over this reference.

New Claim 19 recites a branch pipe joint for refrigerant pipes of a multi-unit type air conditioner in which each of the connections between the refrigerant pipes and connection pipes, and each of the connections between the connection pipes and the branch pipe joint, may be formed by a firm fixing operation using the connection pipes. Each of the connecting pipes has one end portion fitted (inserted) and firmly fixed to one of the communication ports having the same inner diameters, the communication ports being formed to the branch pipe joint body; and another end portion fitted (inserted) and firmly fixed to the respective one of the plurality of the refrigerant pipes having different outer diameters of the multi-unit type air conditioner, the firm fixing operation being able to be performed at an installation site of the multi-unit type air conditioner.

Accordingly, any of the refrigerant pipes, the connecting pipes and the branch pipe joint body can be connected without rotating them. Therefore, **even in a case where the refrigerant pipes are previously arranged in advance and cannot be rotated, or even in a case where the branch pipe joint body cannot be rotated because a plurality of refrigerant pipes are previously connected to the branch pipe joint, the connecting operation to the refrigerant pipes and the branch pipe joint can be easily performed.**

Further, since the connection is performed by firm fixing such as brazing, welding, soldering or the like, a screw (thread) forming operation at the installation site is not required, so that metal chips which may be generated by the screw (thread) forming operation cannot enter the branch pipe joint, and the assembling work for the pipe connections can be easily performed. In addition, even in a case where an internal pressure in the refrigerant piping is increased to a high level, the refrigerant gas circulating through the refrigerant piping will not leak from the connected portions. Therefore, the connecting structure is suitable for refrigerant piping.

In contrast, EPO '984 discloses a connecting pipe of which both end portions are formed with screw portions for connecting the pipe. Accordingly, when the piping and the branch pipe joint are connected using this connecting pipe, the connecting pipe is required to be rotated. However, in a case where the pipes are already plumbed in advance, the pipes cannot be rotated. Therefore, the plumbed pipes cannot be connected at all. In addition, the pipes cannot be connected to the branch pipe joint where the plurality of pipes are connected in advance to the branch pipe joint and the branch pipe joint cannot be rotated.

Further, EPO '984 adopts a screw connection. However, since an actual length of the respective pipes is determined at the installation site of the air conditioner so as to match the actual length of the pipes in most cases, the screw (thread) forming operation at the installation site is essentially required without exception. Therefore, the metal chips generated by the screw (thread) forming operation may enter into the branch pipe joint, so that a cleaning work for removing the chips is disadvantageously required, thus increasing the assembling work of the air conditioner. In addition, when the internal pressure of the refrigerant piping is high, there may be a fear that the refrigerant gas would leak from the connected portions. Therefore, the connection structure of EPO '984 is not suitable for refrigerant piping.

In a preferable aspect of the present invention as specified in Claims 22 and 28, the branch pipe joint body is formed so as to provide Y-shape having two branched portions and one root portion, and two communication ports are formed at the two branched portions while one common communication port is formed at the one root portion. According to the above structure, a branching operation of two refrigerant pipes can be easily performed. In contrast, the branch pipe joint of EPO '984 is not formed as Y-shape, so that the branch pipe joint of EPO '984 is not suitable for two refrigerant pipes.

In another preferable aspect of the present invention as specified in Claims 23 and 28, some of the communication ports are directly firmly fixed to a part of the refrigerant pipes without using the connecting pipes. According to the above structure, it becomes possible to omit the connecting pipe and its fixing, thus contributing to a reduced cost for the connecting pipes. In contrast, in the branch pipe joint of EPO '984, no communication ports are directly firmly fixed to a part of the refrigerant pipes without using the connecting pipes. Accordingly, it is impossible to reduce the cost of the connecting pipes and the fixing step cannot be omitted.

In further aspect of the present invention as specified in Claim 24, there is provided a method of connecting refrigerant pipes of a multi-unit type air conditioner, the method comprising the steps of preparing a branch pipe joint body having a hollow shape and a plurality of communication ports each having the same inner diameter; selecting connecting pipes from a group of connecting pipes at an installation site of the multi-unit type air conditioner, each of the selected connecting pipes having one end portion having an outer diameter enabling the one end portion to be fitted to the communication port and another end portion having an inner diameter enabling the another end portion to be fitted to one of the plurality of the refrigerant pipes having different outer diameters, the connecting pipes and the branch pipe joint body having been packed in one package; and connecting the branch pipe joint body to the refrigerant pipes through the connecting pipes by firmly fitting wherein the connecting pipes are selected from a group consisting of a number of connecting pipes, the number of the connecting pipes being larger than that of the communication ports, and a total number of the connecting pipes having a minimum inner diameter and a maximum inner diameter being smaller than a number of the connecting pipes having inner diameters other than the minimum and maximum inner diameters. According to the above structure, it

becomes possible to cope with the demand for connecting pipes having a required inner diameter with respect to various combinations of the refrigerant pipes having different outer diameter from each other. Further, in the group of the connecting pipes, since the number of the connecting pipes having less possibility of being used for assembling the piping system is reduced, a cost for needless connecting pipes can be effectively reduced.

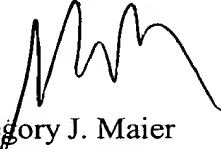
In contrast, EPO '984 neither discloses nor suggests the technical concept of the present invention such that the connecting pipes are selected from a group consisting of a number of connecting pipes, the number of the connecting pipes being larger than that of the communication ports, and is set such that a total number of the connecting pipes having a minimum inner diameter and a maximum inner diameter is smaller than a number of the connecting pipes having an inner diameters other than the minimum and maximum inner diameters. In case of EPO '984, even if the connecting pipes are used at the installation site of the air conditioner, the connecting pipes are selected from a parts box in which a great number of connecting pipes previously formed with screw portions are stocked in advance; or there are prepared a number and kinds of connecting pipes required for coping with the combinations of pipes having different outer diameters from each other. Therefore, it is not possible to cope with a demand at the installation site of the multi-unit type air conditioner. Namely, it is not possible to cope with the demand for connecting pipes having a required inner diameter with respect to various combinations of the refrigerant pipes having different outer diameters from each other.

In a separate letter, Applicant is requesting the approval of drawing corrections to individually identify elements 17a-17d in Figure 2, to correct the pipe 5f in Figure 2 and to individually label elements 17b-17d in Figure 15.

Applicant therefore believes that the present application is in a condition for allowance and respectfully solicits an early Notice of Allowability.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



Gregory J. Maier  
Attorney of Record  
Registration No. 25,599  
Robert T. Pous  
Attorney of Record  
Registration No. 29,099



**22850**

(703) 413-3000  
GJM:RTP/cja

I:\atty\RTP\212903US-am.wpd

212903US-3

**Marked-Up Copy**

Serial No: 09/956,912

Amendment Filed On:

11-18-02

IN THE CLAIMS

--1-18. (Cancelled).

19-24. (New).--